

NOTES ON THE SPECIES OF ERYTHRINA. IX.

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Introduction

Eight papers covering the morphology, distribution, chromosomes, palynology, alkaloids, and amino acids of Erythrina were published in the September and December 1974 issues of Lloydia. A supplement to the symposium is planned for publication, also in Lloydia, sometime in 1977. I have written a brief paper for this supplement to the symposium, but this present paper includes information which is best published separately.

Four hundred eighty-nine new collections were examined in connection with the preparation of these two papers. For a list of species reduced to synonymy, extensions of ranges, etc., see my paper which is to be published in the supplement to the symposium.

1. Erythrina fusca Loureiro, Fl. Cochinch. 427. 1790.

I have seen the following collections from the New World: Belize: L. Dieckman 196 (MO). Panamá: Colón: R. L. Wilbur 11169 (MO). Venezuela: Mérida: Luis Ruíz Terán 493 (MO). Colombia: Chocó: Al. Gentry 9286; Cundinamarca: E. Forero et al. 417. Ecuador: Guayas: L. Holm-Nielsen et al. 7238 (AAU). Surinam: Landsbosh 136 (MO). Brazil: Amazonas: Prance et al. 23520; Bento S. Pena s.n. (March 21, 1975) (MO).

The following collections from the Old World were available: Tonga: M. Hotta 5105 (TI), 5466 (TI).

Two other collections from Guayas, Ecuador, were examined but are not cited here.

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2. Erythrina crista-galli L. Mant. 99. 1767.

Argentina: Buenos Aires: O. Boelcke et al. 14406 (MO).
Paraguay: Jim Conrad 2191.

Two other collections, one from Brazil (Paraná) and the other from Argentina (Corrientes) were examined but are not cited here; also one from Belize, from cult. plant.

3. Erythrina falcata Benth in Mart. Fl. Bras. 15(1): 172. 1859.

Brazil: Rio de Janeiro: G. Pabst 7369; Santa Catarina: L. B. Smith et al. 12800 (MO).

One collection from Brazil (Rio de Janeiro) was examined but is not cited here.

4. Erythrina dominguezii Hassler, Physis 6: 123. 1922.

Argentina: Jujuy: A. Krapovickas et al. 26580 (MO).

5. Erythrina ulei Harms, Verh. Bot. Ver. Brand. 48: 172. 1907.

Ecuador: Zamora Chinchipe: Elbert L. Little et al. 275.
Perú: Cuzco: C. Vargas C. 15537 (MO).

This is the first record of this species from Zamora Chinchipe.

6. Erythrina verna Velloso, Fl. Flum. 304. 1825.

One collection from Brazil (Rio de Janeiro) was examined but is not cited here.

7. Erythrina poeppigiana (Walpers) O. F. Cook, Bull. U. S. Dept. Agr. Bot. 25: 57. 1901.

Venezuela: Mérida: Luis Ruíz Terán 494 (MO). Colombia: Chocó: Rio Tolo, alt. 50 m, E. Forero et al. 1021. Ecuador: Morona Santiago: Elbert L. Little et al. 366. Perú: San Martín: Schunke 8231.

This is the first record of this species from Chocó and Morona Santiago. The collector states on the label of Chocó specimen: "árbol muy común en toda el región."

Two collections, one from Ecuador (Esmeralda) and the other from Bolivia (Bení) were examined but are not cited here.

8. Erythrina suberosa Roxburgh, Fl. Ind. 3: 253. 1832.

Four collections from NW India were examined but are not cited here.

10. Erythrina stricta Roxburgh, Fl. Ind. 3: 251. 1832.

Thailand: C. F. van Beusekom 421 (AAU).

12. Erythrina arborescens Roxburgh, Pl. Coromandel 3: 14, pl. 219. 1819.

China: Sikang: C. Y. Chiao 1772 (S). India: Darjeeling, alt. + 2200 m, H. Ohashi et al. s.n./1972.

13. Erythrina subumbrans (Hasskarl) Merrill, Philipp. Jour. Sci. Bot. 5: 113. 1910.

India: G. Thanikaimoni 1191 (PO); Mysore: C. J. Saldanha 2182 (MO), 15834 (MO), 16454 (MO). Ceylon: Kostermans 25272 (AAU), 25327 (AAU), Kokawa & Hotta 5206 (AAU). Philippines: Quezon: Justo P. Rojo 71 (MO).

Seven collections deposited at S were examined but are not cited here. They are from the Philippines, Sumatra, Java, and Celebes.

14. Erythrina breviflora Alph. DeCandolle, Prodr. 2: 413. 1825.

México: Jalisco: 12 km NW of Los Volcanos, alt. 1900 m, Breedlove 35846.

15. Erythrina edulis Triana, M. Micheli, Jour. de Bot. 6: 145. 1892.

Ecuador: Cotopaxi: L. Holm-Nielsen 1140 (AAU); Tungurahua: L. Holm-Nielsen et al. 241 (AAU), 278 (AAU); Los Rios: Al. Gentry 9650 (S); Loja: A. Paredes 108 (MO); Napo: Al. Gentry 12407; Morona Santiago: Alberto T. Ortega U. 207. Perú: Huanuco: J. Schunke 8313.

This is the first record of this species from Morona Santiago.

Four collections from Ecuador (Pichincha, Loja and Napo) were examined but are not cited here.

18. Erythrina schimpffii Diels, Bibl. Bot. 116: 96. 1937.

Ecuador: El Oro: alt. + 360 m, Plowman 3457 (ECON).

19. Erythrina montana Rose & Standley, Contr. U. S. Nat. Herb. 20: 179. 1919.
México: Durango: alt. \pm 2200 m, Davidse 10023.
- 22a. Erythrina herbacea L. subsp. herbacea. Erythrina herbacea L. Sp. Pl. 706. 1753 sens. str.
U. S. A.: Georgia: Rick Volosen s.n. (Apr. 12, 1970) (MO); Mississippi: Fleet N. Lee 30 (MO). Texas: D. S. Correll 23431.
- 22b. Erythrina herbacea L. subsp. nigrorosea Krukoff & Barneby Phytologia 25(1): 6. 1972.
México: Jalisco: C. Johnson 1973/325 (MO).
- 28b. Erythrina lanata Rose subsp. occidentalis (Standley) Krukoff & Barneby, Phytologia 27: 117. 1973.
México: Jalisco: L. A. Perez 360.
29. Erythrina goldmanii Standley, Contr. U. S. Nat. Herb. 20: 181. 1919.
México: Chiapas: D. E. Breedlove 20397 (MO), 20593 (Cintalapa, alt. \pm 1000 m), 36747 (Cintalapa, alt. \pm 900 m), 23492 and 30362 (Ocozocoautla de Espinosa, alt. 800-1000 m), 23561 (Tuxtla Gutiérrez, alt. 530 m), 23748 (Tonalá, alt. \pm 60 m), 26917 and 36829 (Arriaga, alt. \pm 250 m), 23838 (MO) (Chiapa de Corzo), 37639 (Villa Corzo, alt. \pm 900 m), 38655 (Angel Albino Corzo, alt. \pm 900 m).
- The above-cited and previous collections of D. E. Breedlove from the State of Chiapas cover practically all municipalities in this State.
30. Erythrina caribaea Krukoff & Barneby, Phytologia 25: 9. 1972.
México: Chiapas: mun. Ocozocoautla, alt. \pm 700 m, lower montane rain forest, Breedlove 38698; mun. Ocosingo, alt. \pm 300 m, tropical rain forest, Breedlove 33907.
31. Erythrina folkersii Krukoff & Moldenke, Phytologia 1: 286. 1938.
México: Chiapas: Las Margaritas, alt. \pm 300 m, Breedlove et al. 34268. Belize: J. Dwyer et al. 88 (MO), 12121 (MO), 12507 (MO), 12714 (MO).

36. Erythrina chiapasana Krukoff, Brittonia 3: 304. 1939.

México: Chiapas: Las Margaritas, alt. + 1700 m, Breedlove 33398.

Berlin, Breedlove, and Raven (Principles of Tzeltal Plant Classification, p. 14, 1973) state that this species is common in Pine-Oak-Liquidambar Forest in mun. Tenejapa, Chiapas.

41. Erythrina chiriquensis Krukoff in Brittonia 3: 222. 1939.

Panamá: Croat 15639; Chiriquí: E. A. Lao 354 (MO) (alt. + 2000 m).

45. Erythrina steyermarkii Krukoff & Barneby, Mem. N. Y. Bot. Gard. 20(2): 175. 1970.

Costa Rica: Cartago: along road from Turrialba to Moravia de Chirripo, Burger, W. et al. 10032.

49. Erythrina lanceolata Standley, Contr. U. S. Nat. Herb. 17: 432. 1914.

Costa Rica: Alajuela: alt. + 500 m, W. Burger et al. 10020.

50. Erythrina costaricensis M. Micheli, Bull. Herb. Boiss. 2:445. 1894.

Panamá: J. A. Duke 14503; Coclé: Croat 26126 (MO); Canal Zone: Croat 8667 (MO), Al. Gentry et al. 8657 (MO), Mireya D. Correa A. 484 (MO); Colón: Davidse et al. 10068 (MO); San Blas: Duke 14857. Colombia: Chocó: Rio Tolo, Forero et al. 973; Antioquia: Al. Gentry 9222 (MO).

This is the first record of this species from San Blas.

52. Erythrina americana Miller, Gard. Dict. ed. 8, No. 5. 1768.

México: Veracruz: Orizaba, M. Souza 4438; Chiapas: mun. Bochil, along road to Simojovel, alt. 1250 m.

This is the first record of this species from the State of Chiapas.

53. Erythrina berteroa Urban, Symb. Ant. 5: 370. 1908.

Panamá: Coclé: El Valle de Antón, M. Nee 9219; Canal Zone: Al. Gentry 8629 (MO), 8746 (MO); Colón: Davidse 10068 (MO).

This is the first record of this species from Colón.

54. Erythrina rubrinervia H. B. K. Nov. Gen. & Sp. 6: 434. 1824.
Colombia: Cundinamarca: E. Forero 300 (AAU).
58. Erythrina gibbosa Cufodontis, Arch. Bot. Sist. Fitog. & Genet. 10: 34. 1934.
Panamá: Cocle: Duke 13232; Veraguas: Mori & Kallunki 2537.
61. Erythrina peruviana Krukoff, Brittonia 3: 262. 1939.
Ecuador: Zamora Chinchipe, alt. \pm 1000 m, Elbert L. Little et al. 276.

This is the first record of this species from Zamora Chinchipe.

62. Erythrina mitis Jacquin, Hort. Schoenb. 2: 47. 1797.
Venezuela: Gentry et al. 14823; Miranda: Davidse 4114 (MO).
- 64a. Erythrina corallodendrum L. var. corallodendrum
Erythrina corallodendrum L. Sp. Pl. 706. 1763.
Jamaica: St. Ann, Dulcie Powell 979 (MO).
70. Erythrina oliviae Krukoff, Phytologia 19(3): 128. 1969.
México: Puebla: km 230-231 of the México-Oaxaca highway, bank of dry stream, J. Mejicanos 1977/1 (Feb. 16, 1977), 1977/2.

These two collections were made from the same two trees from which the type and all other collections of this species were made. The trees were leafless (the leaves fell in December) and had mature fruits.

71. Erythrina caffra Thunberg, Prodr. Pl. Cap. 121. 1800.
Eight collections from South Africa (Natal) were examined but are not cited here.
For illustration of this species, see: Palmer, E. & Pitman, N. Trees of South Africa 2: 955-957. 1972, and Killick, Fl. Pl. of Africa 43 (3--4): t. 1709, 1710. 1976.
72. Erythrina lysistemon Hutchinson, Kew Bull. 1933: 422. 1933.
Tanzania: C. F. Paget-Wilkes 211 (MO). South Africa: near Port St. John, R. D. A. Bayliss 7046 (MO).

Eleven collections from South Africa, S. Rhodesia, Tanzania, and from plants in cultivation in Australia (Brisbane) and Hong Kong were examined but are not cited here.

For illustration of this species, see: Palmer E. & Pitman, N. Trees of South Africa 2: 957-959. 1972.

73. Erythrina humeana Sprengel, syst. 3: 243. 1826.

Six specimens from South Africa (Cape Province and Transvaal) were examined but are not cited here.

For illustration of this species, see: Palmer, E. & Pitman, N. Trees of South Africa 2: 961-962. 1972.

74. Erythrina zeyheri Harvey, Fl. Cap. 2: 236. 1862.

Three collections of this species from South Africa (Transvaal) were examined but are not cited here.

75. Erythrina acanthocarpa E. Meyer, Comm. Pl. Afr. Austr. 1: 151. 1836.

Six collections from South Africa (Cape Province) were examined but are not cited here.

77. Erythrina brucei Schweinfurth, Verhand. Zoo.-Bot. Gesell. Wien 18: 653. 1868. et auct. plur., pro majore parte, leguminibus seminibusque exceptis; emend. Gillett, Kew Bull. 15: 428. 1962.

Two collections from Ethiopia, collected at altitudes of + 2250 m and 2800 m, were examined but are not cited here.

79. Erythrina senegalensis Alph. DeCandolle, Prodr. 2: 413. 1825.

Guinée: Jacques-Georges 5348. Nigeria: western state, Roy C. Brown 921 (MO).

Three collections from Senegal and Sierra Leone were examined but are not cited here.

81. Erythrina mildbraedii Harms in Mildbr. Deutsch. Zentr.-Afr. Exp. 1907/1908, 2: 264, tab. 30. 1911.

Nigeria: Ibadan Div., F. N. Hepper 2290 (S).

85. Erythrina decora Harms in Engl. Jahrb. 49: 441. 1913.

South West Africa: Hakasgabirga, E. Busch 7957 (S).

For illustration of this species, see: Palmer, E. & Pitman, N. *Trees of South Africa* 2: 952. 1972.

88. Erythrina addisoniae Hutchinson & Dalziel, *Kew Bull.* 1929: 17. 1929.

Guinée: Jacques-Georges 4745 (MO), 5523 (MO).

89. Erythrina droogmansiana DeWildeman & Th. Durand, *Bull. Soc. Roy. Bot. Belg.* 40: 19. 1901.

Zaire: Orientale: J. Louis 9464 (S).

For the occurrence of this species in Uganda, see the paper by B. Verdcourt & T. J. Synnott in *Kew Bulletin* 30(3): 471-473. 1975.

91. Erythrina sacleuxii Hua, *Bull. Soc. Linn. Paris n.s.* 1: 54. 1898.

Kenya: Kwale Dist., P. J. Greenway 9646 (S). Tanzania: Bezirk Lindi, H. J. Schlieben 5634 (S), 6193 (S).

93. Erythrina sigmoidea Hua, *Bull. Mus. Hist. Nat. Par.* 3: 327. 1897.

Nigeria: Latilo et al. 69374 (MO).

94. Erythrina latissima E. Meyer, *Comm. Pl. Afr. Austr.* 1: 151. 1836.

Four collections from Rhodesia and South Africa (Natal) were examined but are not cited here.

For illustrations of this species, see Killick, *Fl. Pl. of Africa* 43(3-4): t. 1709, 1710. 1976, also Palmer, E. & Pitman, N., *Trees of South Africa* 2: 959-961. 1972.

95. Erythrina abyssinica Lamarck, *Encycl. Bot.* 2: 392. 1788; *DC Prodr.* 2: 413. 1825.

Ruanda: P. Auquier 2652 (MO). Tanzania: G. W. Frame 529 (MO), C. F. Paget-Wilkes 210 (MO). Malawi: Jean Pawek 6347 (MO), 7748 (MO). Rhodesia: Adele Lewis Grant s.n. (July 1928) (MO).

Twenty-three collections from Ethiopia, Eritrea, Kenya, Tanzania, Mozambique, S. Rhodesia, and Angola were examined but are not cited here.

96. Erythrina variegata L. Herb. Amboin. 10. 1754; Amoen. Acad. 4: 122. 1759.

India: C. Thanikaimoni 1181 (Pondichery). Taiwan. C. Owatari s.n. (March 1, 1898) (TI), L. Sasaki s.n. (Sept. 8, 1965) (TI). Ryukyu Islands: R. J. Alvis 73 (TI). Okinawa Islands: S. Hatusima 17497 (TI). Jaluit Islands: G. Koidzumi s.n. (Jan. 1915) (TI). Palau: T. Tuyama s.n. (Aug. 28, 1939) (TI).

Seven collections from Java, Celebes, Solomon Islands, and Fiji were examined but are not cited here; also three collections from Virgin Islands (St. Croix and Tortola) which are from cultivated plants.

102. Erythrina velutina Willdenow, Gest. Nat. Freunde Berlin Neue Schr. 3: 426. 1801.

Venezuela: Anzoátegui: Luis Ruíz Terán 350 (MO). Ecuador: Manabi: C. A. Dodson & L. B. Thien 1009, Al. Gentry 12204; Guayas: Al. Gentry 10077; Galápagos Islands: F. R. Fosberg 44917 (MO), 44944 (MO). Perú: Plowman 5437 (Tumbes, alt. + 550 m).

104. Erythrina burttii Baker f., Jour. Bot. 70: 254. 1932.

Kenya: Kajiado Dist.: Greenway 9579 (S).

105. Erythrina burana R. Chiovenda, Att. R. Accad. Ital., Mem. Sc. Fis. Mat. & Nat. 11: 27. 1940.

Ethiopia: Harar: students of Imper. Ethiop. College of Agr. & Mech. Arts s.n. (S).

The collectors state that this species is very common in Harar and is planted on campus.

106. Erythrina perrieri R. Viguier, Not. Syst. 14: 175. 1952.

Mauritius: Ile aux Cerfs, D. Lorence 7 (1975) (MO).

The collector states on the label: "flowers scarlet, occasional locally."

This is the first record of this species from Mauritius.

Hybrids

1. Erythrina x bidwillii Lindley, Bot. Reg. 33: pl. 9. 1849.

Japan: Tokyo, Shinjiku-gyon, M. Togashi s.n. (July 6, 1968) (TI) (cult.).

7. Erythrina x sykesii Barneby & Krukoff, *Lloydia* 37: 447. 1974.

Western Australia: Perth: Univ. Campus, David Ladd s.n.
(June 9, 1970) (MO).

The collector states on the label: "common Perth street tree."

Bibliography

(In order to conserve space, we are citing here only the papers which are not cited in Supplements III-VIII.)

1. Barton, Derek H. R. et al. Phenol oxidation and biosynthesis, Part XXII. The alkaloids of E. lysistemom, E. abyssinica, E. poeppigiana, E. fusca, and E. subumbrans (as "E. lithosperma Blume"). *J. Chem. Soc. (C.)* 652-654. 1971.
2. Bhakuni, D. S. & N. M. Khanna. Chemical examination of the bark of Erythrina variegata (as "indica Lam."). *J. Sci. Ind. Res. Sect. B* 18: 494. 1959.
3. Bocquet, G. & J. O. Derron. Les Erythrina de la République de Sao Tomé et Príncipe. *Ber. Schweiz. Bot. Ges.* 85(4): 298-302. 1975.
4. Chopra, R. N., S. Ghosh & B. N. Sen. Some common indigenous remedies--Erythrina variegata (as "indica"). *Indian J. Med. Res.* 22: 265. 1934.
5. Ghosal, S., S. K. Dutta & S. K. Bhattacharya. Erythrina--Chemical and pharmacological evaluation II: Alkaloids of Erythrina variegata L. *J. Pharm. Sci.* 61: 1274. 1972.
6. Krukoff, B. A. Notes on the species of Erythrina. VIII. *Phytologia* 33: 342-355. 1976.
7. Letcher, R. M. Alkaloids of Erythrina lysistemom. 11--Methoxyerythraline, a new alkaloid. *J. Chem. Soc. (C.)* 652. 1971.
8. Singh, H. & A. S. Chawla. Isolation of erysodine, eryso-trine and hypaphorine from Erythrina suberosa Roxb. seeds. *Experientia* 25: 785. 1969.
9. Singh, H., A. S. Chawla, J. W. Rowe & J. K. Toda. Waxes and sterols of Erythrina suberosa bark. *Phytochemistry* 9: 1673. 1970.

10. Singh, H. & A. S. Chawla. Chemical constituents of Erythrina suberosa Roxb. seeds. J. Pharm. Sci. 59: 1179. 1970.
11. Singh, H. & A. S. Chawla. Study of the chemical constituents of seeds of Erythrina variegata (as E. variegata var. orientalis"). Planta Med. 19: 71. 1970.
12. Singh, H. & A. S. Chawla. Study of Erythrina suberosa leaves. Planta Med. 19: 378. 1971.
13. Singh, H., A. S. Chawla, A. K. Jindal, M. R. Subbaram & K. T. Achaya. Seed oils of Erythrina arborescens and E. stricta. Indian J. Technol. 10: 115. 1972.
14. Singh, H. et al. Investigation of Erythrina spp. VII. Chemical constituents of Erythrina variegata (as "E. variegata var. orientalis"). Lloydia 38: 97-100. 1975.
15. Gustafson, R. Erythrina in Southern California. Hortulus Aliquando 1: 5-11. 1975-6.